

# Exam Engine Web Service Documentation

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This document describes the Exam Engine Web Service configuration and implementation. Note that the use of this web service is optional. It is used to provide these pieces of Exam Engine functionality:

- Email technical support.
- Read questions and objectives from the web service rather than from a local XML file.
- Store student data in a web-based database.
- The ability to run the *Exam Engine Reporter* against the web-based student data.
- Email student results to an administrator, with optional Word, Excel, HTML, and/or plain text attachments.

## Directory Structure

The layout of the web service directory structure is shown to the right. You would normally copy the entire

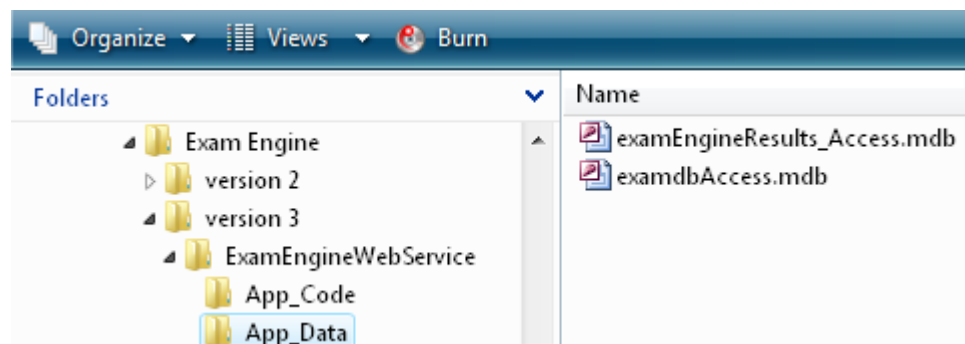
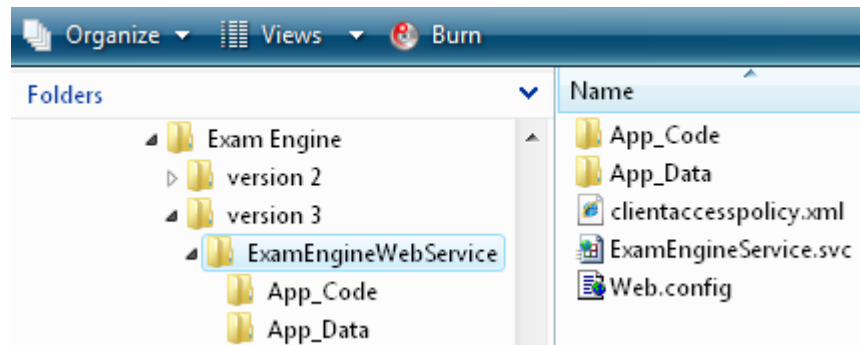
*ExamEngineWebService* directory structure to your web server and then configure it as described in the next section.

The *ExamEngineService.svc* file is the actual web service

referenced by the Exam Engine exam and by the *Exam Engine Reporter* application. The *clientaccesspolicy.xml* is a special XML file that allows client-side applications like Exam Engine to access the service. You can give more restrictions if desired. See [http://msdn.microsoft.com/en-us/library/cc197955\(VS.95\).aspx](http://msdn.microsoft.com/en-us/library/cc197955(VS.95).aspx) for details. The *Web.config* file has a number of user-configurable settings as discussed later in this document.

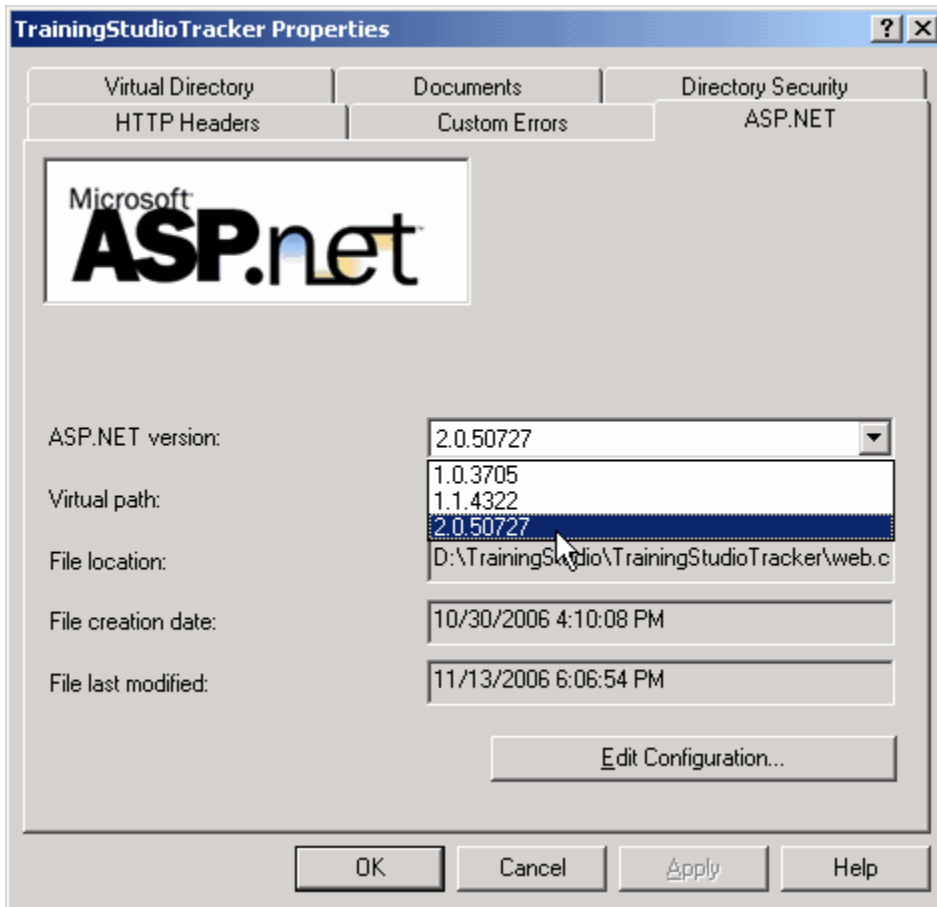
Inside the *App\_Code* directory are several code files that contain the programming of the web service. They should not be edited directly but rather should be maintained through editing this “Web Site Project” via Visual Studio .NET 2008.

The *App\_Data* directory contains the Access and/or XML database files for both the questions (if loading questions via the web service) and results (if storing results). If you are using SQL Server for either of these tasks, then there will not be a corresponding file in this directory. The format, directory, and file name are set in the *Web.config* file as explained below.



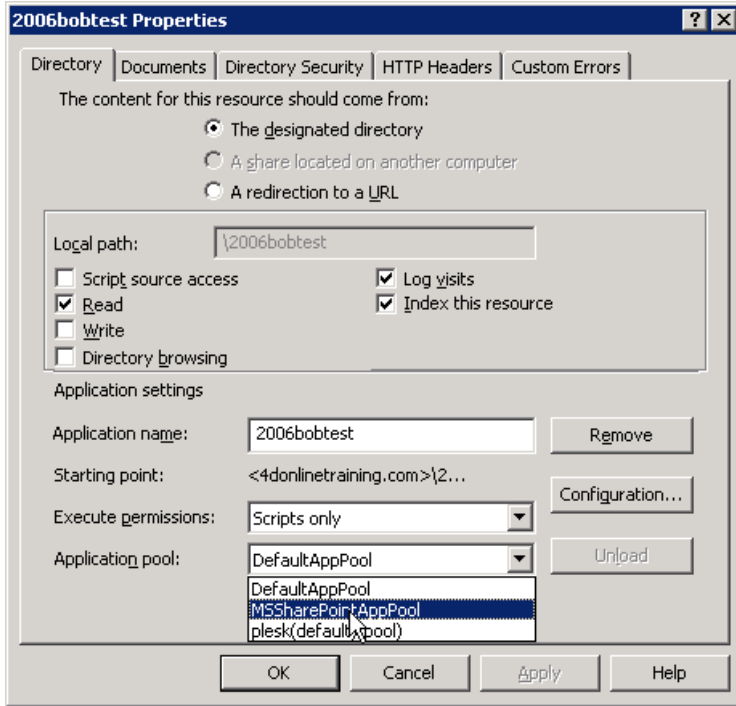
## Deploying the Web Service

To begin working with the web service, you must put its directory structure on the web server and make it into an ASP.NET 2.0 virtual directory/application. If your local computer has Internet Information Services (IIS) and ASP.NET installed, you can do this locally for testing as well. If you have multiple versions of the .NET runtime on the web server, then you will be able to choose 2.0 from the ASP.NET tab as shown below. Note that this screen capture is for a different virtual directory name – yours would be *ExamEngineWebService* but could be another virtual directory name. You might choose another name if you are hosting multiple web services on your site for different customers.

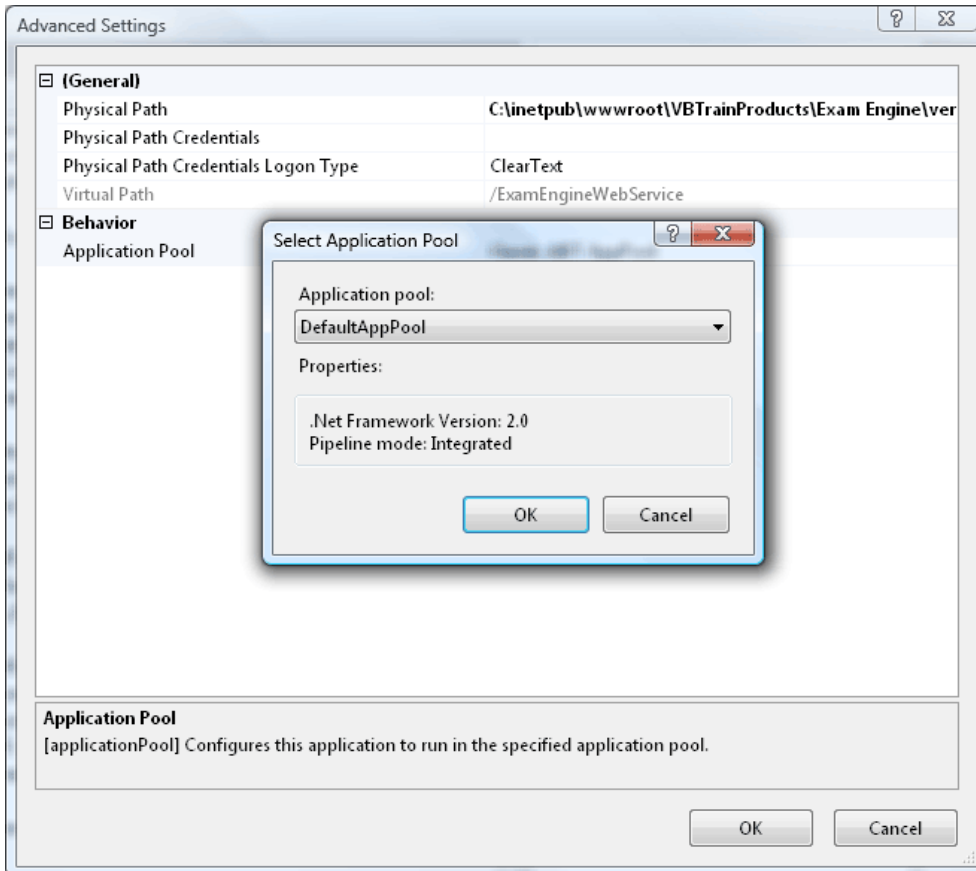


**Note: If you are running IIS 6 or later, it is critical that you select an application pool that only has ASP.NET 2.0 applications in it.**

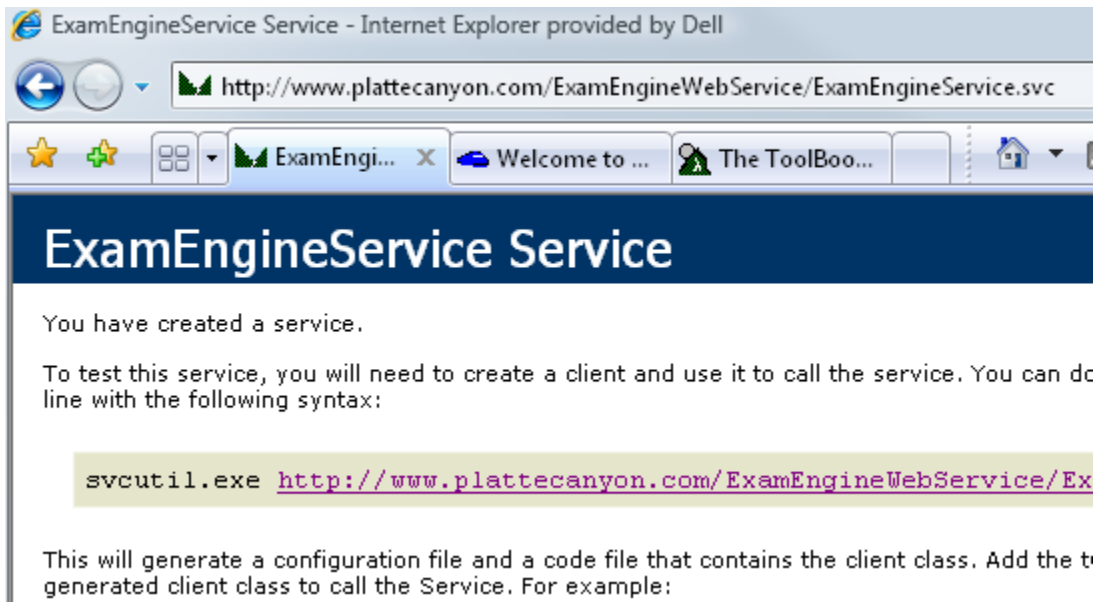
Mixing .NET 1.1 and 2.0 applications within the same pool can cause both the web service and the 1.1 application to fail. The setting for an application pool is shown below.



Or



You can tell if the web service is set up correctly if you can navigate to the *ExamEngineService.svc* file and see a screen like the one below.



Note that this URL is what is required in the *Exam Engine Configuration Editor* as described later in this document. It is also needed by the users of the *Exam Engine Reporter* application, also described below. If you are prompted for any type of logon before reaching this screen, then neither of these will work.

Due to security restrictions on the Silverlight player related to communicating with other domains, we recommend that you place the provided *clientaccesspolicy.xml* file on the web server containing the web service. It normally needs to be set on the *root* of the web site. For example, we place it at <http://www.plattecanyon.com> rather than at <http://www.plattecanyon.com/ExamEngineWebService>. Here is the content of that file:

```
<?xml version="1.0" encoding="utf-8" ?>
<access-policy>
  <cross-domain-access>
    <policy>
      <allow-from http-request-headers="*">
        <domain uri="*" />
      </allow-from>
      <grant-to>
        <resource include-subpaths="true" path="/" />
      </grant-to>
    </policy>
  </cross-domain-access>
</access-policy>
```

This file allows Silverlight communications from any domain. You can make this file more restrictive if desired. See [http://msdn.microsoft.com/en-us/library/cc197955\(VS.95\).aspx](http://msdn.microsoft.com/en-us/library/cc197955(VS.95).aspx) for details.

## Setting the baseAddressPrefixFilters

If you deploy your service and get an error like this, “This collection already contains an address with scheme http,” you need to uncomment the baseAddressPrefixFilters area of the *Web.config* file and set the prefix to the domain of your web site. For example, on our version deployed on plattecanyon.com, the entry looks like this:

```
<serviceHostingEnvironment aspNetCompatibilityEnabled="true">
  <!-- Following needed to avoid "This collection already contains an address
with scheme http" error. Need to comment out to run localhost -->
  <baseAddressPrefixFilters>
    <add prefix="http://www.plattecanyon.com"/>
  </baseAddressPrefixFilters>
</serviceHostingEnvironment>
```

This mainly happens on shared hosting servers. See <http://msdn.microsoft.com/en-us/library/bb924481.aspx> and <http://stackoverflow.com/questions/506634/wcf-config-element-baseaddressprefixfilters> for more information.

## Editing the Web.config File

The web.config file located in the main directory of the web service has a number of user-configurable settings. These are all located in the *<appSettings>* area of the file. Each setting is described below. After editing the web.config (and keeping a backup copy of the original), you can replace the one on your web server.

Key Name	Description	Example
CacheTimeInMinutes	This is the number of minutes that certain items like these settings will remain in memory rather than being read from the <i>Web.config</i> file.	<pre>&lt;add key="CacheTimeInMinutes" value="60" /&gt;</pre>
DataSourceAccessName	This is the file name for the questions database if the <i>DataSourceType</i> is set to Access. It is located at the relative or absolute path set by the <i>DataSourceAccessPath</i> setting. Note that this name can be sent to the exam via the <i>dbName</i> query string parameter. In that case, that name will override this <i>Web.config</i> value.	<pre>&lt;add key="DataSourceAccessName" value="examdbAccess.mdb" /&gt;   &lt;!-- file name for Access. Can be overridden by dbName query string --&gt;</pre>
DataSourceAccessPassword	This is the optional password for the questions database if the <i>DataSourceType</i> is set to Access.	<pre>&lt;add key="DataSourceAccessPasswor d" value="" /&gt; &lt;!-- Optional for Access --&gt;</pre>
DataSourceAccessPath	This is the relative or absolute path	<pre>&lt;add</pre>

Key Name	Description	Example
	for the questions database if the <i>DataSourceType</i> is set to Access. You would normally want to leave this as App_Data as ASP.NET prevents files in that directory from being downloaded via the browser. However, you can set an absolute path outside the web site directory if desired.	<pre>key="DataSourceAccessPath" value="App_Data"/&gt; &lt;!-- relative or absolute path for Access --&gt;</pre>
DataSourceAccessUserName	This is the optional username for the questions database if the <i>DataSourceType</i> is set to Access.	<pre>&lt;add key="DataSourceAccessUserNam e" value=""/&gt; &lt;!-- Optional for Access --&gt;</pre>
DataSourceSaveDataName	This is the <i>name</i> of the Access or XML file used to save student results. For SQL Server, this is the <i>database name</i> . We recommend using Access or SQL Server for performance reasons. The type of database is set via the <i>ResultsDataSourceType</i> setting.	<pre>&lt;add key="DataSourceSaveDataName" value="examEngineResults_Acc ess.mdb"/&gt; &lt;!-- filename for XML and Access, database name for SQL --&gt;</pre> Or <pre>&lt;add key="DataSourceSaveDataName" value="ExamEngineResults3"/&gt;</pre>
DataSourceSaveDataPassword	This is the password to the database used to save student results. It is not needed for XML, optional for Access, and required for SQL Server. The type of database is set via the <i>ResultsDataSourceType</i> setting.	<pre>&lt;add key="DataSourceSaveDataPassw ord" value=""/&gt; &lt;!-- not needed or XML, optional for Access, required for SQL --&gt;</pre>
DataSourceSaveDataPath	This is the relative or absolute path for the student results database if the <i>ResultsDataSourceType</i> is Access or XML. For these types, you would normally want to leave this as App_Data as ASP.NET prevents files in that directory from being downloaded via the browser. However, you can set an absolute path outside the web site directory if desired. For SQL Server, this is the name or IP address of the SQL Server instance.	<pre>&lt;add key="DataSourceSaveDataPath" value="App_Data"/&gt; &lt;!-- subdirectory for XML or Access (App_Data usually), server name for SQL --&gt;</pre> Or <pre>&lt;add key="DataSourceSaveDataPath" value="(local)"/&gt;</pre>
DataSourceSaveDataUserName	This is the username for the database used to save student results. It is not needed for XML, optional for Access, and required	<pre>&lt;add key="DataSourceSaveDataUserNam e" value=""/&gt; &lt;!-- not needed or XML, optional for Access, required for SQL --&gt;</pre>

Key Name	Description	Example
	for SQL Server. The type of database is set via the <i>ResultsDataSourceType</i> setting.	
DataSourceSqlName	This is the name of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlName" value="ExamEngineQuestions3"/&gt;&lt;!-- database name for SQL Server. --&gt;</pre>
DataSourceSqlPassword	This is the password of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPassword" value="happy"/&gt; &lt;!-- Mandatory for SQL Server --&gt;</pre>
DataSourceSqlPath	This is the server name or IP address of the server if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPath" value="local"/&gt; &lt;!-- Server name or IP address for SQL Server --&gt;</pre>
DataSourceSqlUserName	This is the username of the database if the <i>DataSourceType</i> is set to SQL.	<pre>&lt;add key="DataSourceSqlPassword" value="happy"/&gt; &lt;!-- Mandatory for SQL Server --&gt;</pre>
DataSourceType	This is the type of database to be used if you are loading questions from the web server. Valid values are Access, XML, or SQL.	<pre>&lt;add key="DataSourceType" value="Access"/&gt; &lt;!-- Access, XML, or SQL --&gt;</pre>
DataSourceXmlName	This is the file name for the questions database if the <i>DataSourceType</i> is set to XML. It is located at the relative or absolute path set by the <i>DataSourceAccessPath</i> setting. Note that this name can be sent to the exam via the <i>dbName</i> query string parameter. In that case, that name will override this <i>Web.config</i> value.	<pre>&lt;add key="DataSourceXmlName" value="examdb.xml"/&gt; &lt;!-- file name for XML. Can be overridden by dbName query string --&gt;</pre>
DataSourceXmlPath	This is the relative or absolute path for the questions database if the <i>DataSourceType</i> is set to XML. You would normally want to leave this as <i>App_Data</i> as ASP.NET prevents files in that directory from being downloaded via the browser. However, you can set an absolute path outside the web site directory if desired.	<pre>&lt;add key="DataSourceXmlPath" value="App_Data"/&gt; &lt;!-- relative or absolute path for XML --&gt;</pre>
EmailCredentialsDomain	This is the optional domain for computer name that verifies the other email credentials. It is often left blank. See <a href="http://msdn.microsoft.com/en-us/library/system.net.networkcreden">http://msdn.microsoft.com/en-us/library/system.net.networkcreden</a>	<pre>&lt;add key="EmailCredentialsDomain" value=""/&gt;</pre>

<i>Key Name</i>	<i>Description</i>	<i>Example</i>
	<a href="#">tial.domain.aspx</a> for more details.	
EmailCredentialsPassword	This is the optional password for your email credentials. On some systems, credentials are required in order for the mail server listed in <i>SmtServer</i> to allow emails from your application.	<pre>&lt;add key="EmailCredentialsPassword" value="aaabbbb" /&gt;</pre>
EmailCredentialsUsername	This is the optional username for your email credentials. On some systems, credentials are required in order for the mail server listed in <i>SmtServer</i> to allow emails from your application.	<pre>&lt;add key="EmailCredentialsUsername" value="happy@plattecanyon.com" / &gt;</pre>
ExamEngineReporterKey	This key must match the key being sent by the <i>Exam Engine Reporter</i> application as described later in this document. This key gives the Reporter the ability to view various Exam and Question reports.	<pre>&lt;add key="ExamEngineReporterKey" value="AABBCC11223344" /&gt;</pre>
ExamEngineTrackingKey	This key must match the <i>Access Key</i> set in the <i>Exam Engine Configuration</i> program and read by the individual exam.	<pre>&lt;add key="ExamEngineTrackingKey" value="11223344AABBCC" /&gt;</pre>
IndividualFileName	This value is used as part of the name of the optional XML database of the user results that can be sent to an administrator. This value is used if there is no "User Id" value to use as the basis for the file name.	<pre>&lt;add key="IndividualFileName" value="individualresults"/&gt; &lt;!-- - used as part of emailed attachments --&gt;</pre>
Label_ExamName	This is the label used to denote the "Exam Name" in emails to administrators with student results. It is editable here for localization purposes.	<pre>&lt;add key="Label_ExamName" value="Exam Name:" /&gt;</pre>
Label_UserName	This is the label used to denote the "User" in emails to administrators with student results. It is editable here for localization purposes.	<pre>&lt;add key="Label_UserName" value="User:" /&gt;</pre>
ReportAlternatingItemBackgroundColor	This is the alternating row color used in the HTML format emails and attachments to administrators. Every other row will have this color. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportAlternatingItemBackg roundColor" value="#EFE7E7" /&gt;</pre>

<i>Key Name</i>	<i>Description</i>	<i>Example</i>
ReportHeaderBackgroundColor	This is the header color used in the HTML format emails and attachments to administrators. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportHeaderBackgroundColo r" value="#E7E7EF" /&gt;</pre>
ReportItemBackgroundColor	This is the alternating row color used in the HTML format emails and attachments to administrators. Every other row will have this color. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportItemBackgroundcolor" value="#d6ccc2" /&gt;</pre>
ReportItemDateColor	This style is not currently used but is defined in case users want to incorporate it into their HTML format emails or attachments. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportItemDateColor" value="Black" /&gt;</pre>
ReportItemTitleColor	This is the text color of the title at the top of the HTML format emails and attachments to administrators. It typically has the exam name and the date in it. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportItemTitleColor" value="Black" /&gt;</pre>
ReportTitleColor	This is the text color of the title of the exam used in the HTML format emails and attachments to administrators. It needs to be in the same format as for a CSS style, typically RGB in hexadecimal format with the # symbol in front. Standard named colors are acceptable as well.	<pre>&lt;add key="ReportItemTitleColor" value="Black" /&gt;</pre>
ResultsDataSourceType	This is the type of database to be used if you are saving student data on the web server. Valid values are	<pre>&lt;add key="ResultsDataSourceType" value="Access" /&gt; &lt;!-- Access,</pre>

Key Name	Description	Example
	Access, XML, or SQL. We recommend Access or SQL for performance reasons.	XML, or SQL -->
SmtptServer	This is the Simple Mail Transfer Protocol (SMTP) server for the notification email. This will be specific to your web server. If you are running the web service on your local computer for testing, you would put the machine name in for this setting. You can get the machine name via <i>My Computer – Properties</i> . Using the machine name, “(local),” or “localhost” works for some web servers as well.	<add key="SmtptServer" value="smtp.plattecanyon.com"/>

## Linking to the Web Service in the *Exam Engine Configuration Editor*

The URL to the web service as well as the *ExamEngineTrackingKey* is needed by users of the *Exam Engine Configuration Editor*. You set these values on the General Properties – General Tab as shown below:

Web Service

If you are using a web service, enter or edit the settings for the Exam Engine web service.

URL:

Access Key:

Put the correct URL in place of <http://www.plattecanyon.com/ExamEngineWebService/ExamEngineService.svc>.

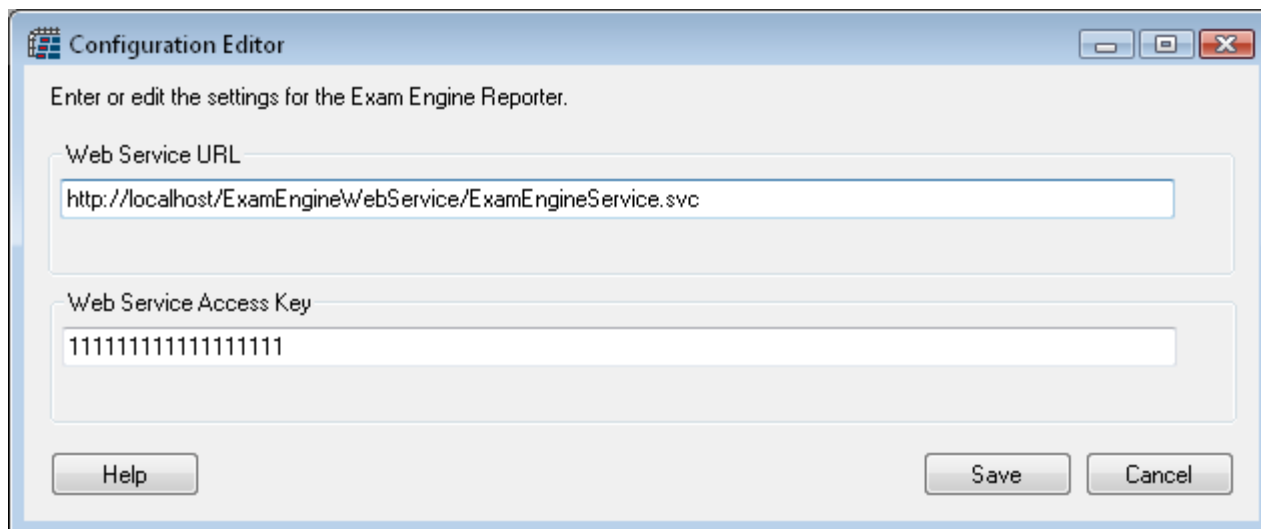
Put in the value of your *ExamEngineTrackingKey* into the *Access Key* field.

Again, you will want this to match the *ExamEngineTrackingKey* defined in *Web.config*.

You can edit the base configuration file (examengineconfig3.xml) located in the \config subdirectory underneath the ExamEngineConfiguration3.exe file if you want all new exams to be pre-populated with this information. The elements to be edited are <WebServiceUrl> and <ExamEngineTrackingKey>

## Configuring the *Exam Engine Reporter Application*

The URL to the web service as well as the *ExamEngineReporterKey* is needed by users of the *Exam Engine Reporter* application in order for it to communicate with the web service and display reports. The *Exam Engine Reporter* Configuration screen is shown below:



The user the Web Service URL and Web Service Access Key (which must match the *ExamEngineReporterKey* defined in the *Web.config* file). Once the user saves this information, it is restored each time he or she opens the *Exam Engine Reporter* application.